AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

CLAIM 1 (Canceled)

1. An optically clocked optoelectronic track and hold apparatus, comprising:

   a) a diode bridge comprising a first node, a second node, a third node, a fourth node and a plurality of diodes, wherein said plurality of diodes comprises:

      i) a first diode having a cathode operatively coupled to said first node and an anode operatively coupled to said second node;

      ii) a second diode having a cathode operatively coupled to said third node and an anode operatively coupled to said first node;

      iii) a third diode having a cathode operatively coupled to said fourth node and an anode operatively coupled to said second node;

      iv) a fourth diode having a cathode operatively coupled to said third node and an anode operatively coupled to said fourth node;

   b) an input node, operatively coupled to said first node of said diode bridge, capable of receiving an analog input signal;

   c) a first current source, operatively coupled to said second node of said diode bridge and a second current source, operatively coupled to said third node of said diode bridge, and wherein said first and second current sources are capable of forward biasing said diode bridge;

   d) a first photodetector having a cathode operatively coupled to said second node and an anode operatively coupled to a negative potential node and a second photodetector having an anode operatively coupled to said third node and a cathode operatively coupled to a

positive potential node, and wherein said first and second photodetectors are capable of receiving an optical input clocking signal, and capable of reverse biasing and forward biasing said diode bridge in response to said optical input clocking signal;

e) a hold capacitor, operatively coupled to said fourth node, capable of tracking said analog input signal when said diode bridge is forward biased, and capable of holding said analog input signal when said diode bridge switches from forward biased to reverse biased.

CLAIM 2 (Canceled)

CLAIM 3 (Canceled)

3. The optically clocked optoelectronic track and hold apparatus of Claim 1, wherein said first and second photodetectors are reverse biased by voltage sources.

CLAIM 4 (Canceled)

CLAIM 5 (Canceled)

5. The optically clocked optoelectronic track and hold apparatus of Claim 3, wherein said optical input clocking signal comprises a first optical input clocking signal and a second optical input clocking signal, wherein said first photodetector is capable of receiving said first optical input clocking signal, and wherein said second photodetector is capable of receiving said second optical input clocking signal, and wherein said first optical input clocking signal and said second optical input clocking signal are synchronized.

CLAIM 6 (Canceled)

6. The optically clocked optoelectronic track and hold apparatus of Claim 1, wherein said first and second photodetectors have fast rise times and long fall times.

CLAIM 7 (Canceled)

7. The optically clocked optoelectronic track and hold apparatus of Claim 1, wherein said first and second photodetectors switch said diode bridge from forward biased to reverse biased when said optical input clocking signal illuminates said first and second photodetectors with an optical pulse.

CLAIM 8 (Canceled)

8. The optically clocked optoelectronic track and hold apparatus of Claim 1, wherein said first and second photodetectors switches said diode bridge from reverse biased to forward biased when said first and second photodetectors do not generate enough photocurrent to reverse bias said diode bridge.

CLAIM 9 (Canceled)

9. The optically clocked optoelectronic track and hold apparatus of Claim 1, wherein said optically clocked optoelectronic track and hold apparatus is configured into a positive node device and a negative node device, wherein said optically clocked optoelectronic track and hold apparatus receives said analog input signal and an inverted analog input signal and outputs a differential output signal.

CLAIM 10 (Canceled)

10. The optically clocked optoelectronic track and hold apparatus of Claim 1, wherein said optically clocked optoelectronic track and hold apparatus further comprises an amplifier,

operatively coupled to said hold capacitor, capable of outputting a first track and hold output signal.

CLAIM 11 (Canceled)

11. The optically clocked optoelectronic track and hold apparatus of Claim 10, wherein said optically clocked optoelectronic track and hold apparatus further comprises a quantizer, operatively coupled to said amplifier, capable of quantizing said first track and hold output signal and outputting a digital output signal.

CLAIM 12 (Canceled)

12. The optically clocked optoelectronic track and hold apparatus of Claim 10, wherein said optically clocked optoelectronic track and hold apparatus further comprises an electronic track and hold device, operatively coupled to said amplifier, capable of receiving said first track and hold output signal and an electronic clock signal, and wherein said electronic track and hold device is capable of outputting a second track and hold output signal.

CLAIM 13 (Currently amended)

13. [[The optically clocked optoelectronic track and hold apparatus of Claim 1]] An optically clocked optoelectronic track and hold apparatus, comprising:

    a. a diode bridge comprising a first node, a second node, a third node, a fourth node and a plurality of diodes, wherein said plurality of diodes comprises:

        i. a first diode having a cathode operatively coupled to said first node and an anode operatively coupled to said second node;

        ii. a second diode having a cathode operatively coupled to said third node

and an anode operatively coupled to said first node;

iii. a third diode having a cathode operatively coupled to said fourth node and an anode operatively coupled to said second node;

iv. a fourth diode having a cathode operatively coupled to said third node and an anode operatively coupled to said fourth node;

b. an input node, operatively coupled to said first node of said diode bridge, capable of receiving an analog input signal;

c. a first current source, operatively coupled to said second node of said diode bridge and a second current source, operatively coupled to said third node of said diode bridge, and wherein said first and second current sources are capable of forward biasing said diode bridge;

d. a first photodetector having a cathode operatively coupled to said second node and an anode operatively coupled to a negative potential node and a second photodetector having an anode operatively coupled to said third node and a cathode operatively coupled to a positive potential node, and wherein said first and second photodetectors are capable of receiving an optical input clocking signal, and capable of reverse biasing and forward biasing said diode bridge in response to said optical input clocking signal, wherein a photodetector of said first and second photodetectors comprises a short transit time photodiode and a long transit time photodiode in a parallel configuration;

e. a hold capacitor, operatively coupled to said fourth node, capable of tracking said analog input signal when said diode bridge is forward biased, and capable of holding said analog input signal when said diode bridge switches from forward

biased to reverse biased.

CLAIM 14 (Original)

14. The optically clocked optoelectronic track and hold apparatus of Claim 13, wherein said short transit time photodiode and said long transit time photodiode are focus illuminated in I regions near junctions between P regions and N regions.

CLAIM 15 (Original)

15. A method for optically clocked optoelectronic tracking and holding, the method comprising the steps of:

    a. receiving an analog input signal and an optical input clocking signal;

    b. determining whether an optical pulse is received by at least two photodetectors from said optical input clocking signal;

    c. maintaining a diode bridge in forward bias and returning to STEP (a) if said optical pulse is not received from said optical input clocking signal;

    d. switching said diode bridge to reverse bias for a desired time and returning to STEP (a) if said optical pulse is received from said optical input clocking signal.

CLAIM 16 (Original)

16. The method of Claim 15, wherein said switching said diode bridge to reverse bias for a desired time step comprises the following sub-steps:

    i. generating photocurrent sufficient to reverse bias said diode bridge if said optical pulse is received from said optical input clocking signal;

    ii. maintaining sufficient photocurrent to reverse bias said diode bridge for said desired time;

iii. switching said diode bridge to forward bias when photocurrent becomes insufficient to reverse bias said diode bridge;

iv. returning to STEP (a) of Claim 15.

CLAIM 17 (Original)

17. The method of Claim 15, wherein said maintaining diode bridge in forward bias step comprises forward biasing said diode bridge by said at least two photodetectors not generating enough photocurrent.

CLAIM 18 (Original)

18. The method of Claim 15, wherein said switching said diode bridge to reverse bias for said desired time step comprises reverse biasing said diode bridge by said at least two photodetectors quickly switching to an on-state.

CLAIM 19 (Original)

19. The method of Claim 15, wherein said switching said diode bridge to reverse bias for said desired time step uses a long transit time photodiode to maintain sufficient photocurrent for said desired time.

CLAIM 20 (Original)

20. An optically clocked optoelectronic track and hold apparatus, comprising:

a. means for receiving an analog input signal and an optical input clocking signal;

b. means for determining whether an optical pulse is received by at least two photodetectors from said optical input clocking signal;

c. means for maintaining a diode bridge in forward bias if said optical pulse is not

received from said optical input clocking signal;

d. means for switching said diode bridge to reverse bias for a desired time if said optical pulse is received from said optical input clocking signal.